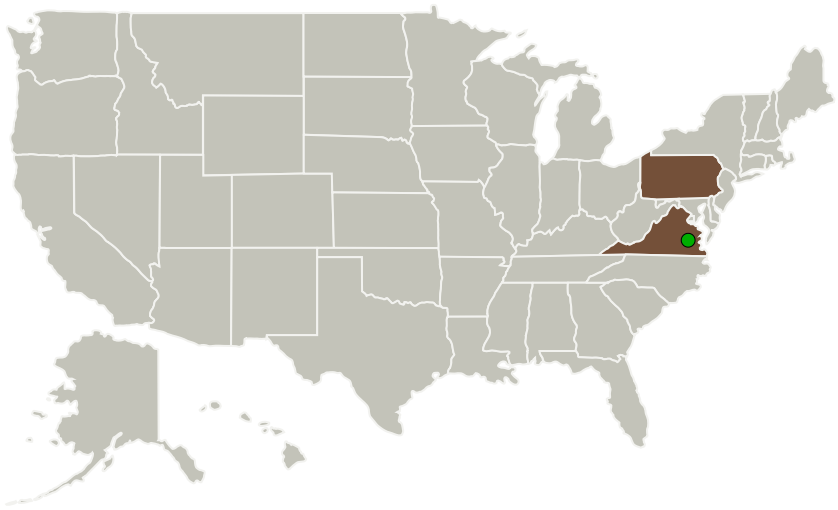
Epoxy/UHMWPE Composite Hybridized with Gadolinium Nanoparticles for Space Exploration, Phase I

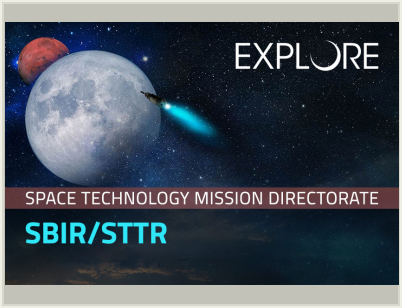
Completed Technology Project (2015 - 2015)

Project Introduction

Abstract Deep space radiations pose a major threat to the astronauts and their space craft during the long duration space exploration expeditions [1]. Ultra High Molecular Weight Polyethylene (UHMWPE) fibers apart from possessing radiation shielding properties by the virtue of the high hydrogen content are known for extraordinary properties. To prevent the deleterious effects of secondary neutrons, targets such as Gadolinium are required. The objective of the proposed research is to develop Ultra High Molecular Weight Polyethylene (UHMWPE) Fiber Epoxy Composite Hybridized with Nanoparticles of Gadolinium for Radiation Shielding Application. Experience gained in the proposed study could be used to design light weight radiation shielding structures for aerospace application.

Primary U.S. Work Locations and Key Partners





Epoxy/UHMWPE Composite Hybridized with Gadolinium Nanoparticles for Space Exploration, Phase I

Table of Contents

Epoxy/UHMWPE Composite Hybridized with Gadolinium Nanoparticles for Space Exploration, Phase I

Completed Technology Project (2015 - 2015)

Organizations Performing Work	Role	Type	Location
Amchemteq, Inc	Lead Organization	Industry Minority-Owned Business, Women-Owned Small Business (WOSB)	Port Matilda, Pennsylvania
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Pennsylvania	Virginia

Project Transitions

June 2015: Project Start

December 2015: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138983)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Amchemteq, Inc

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

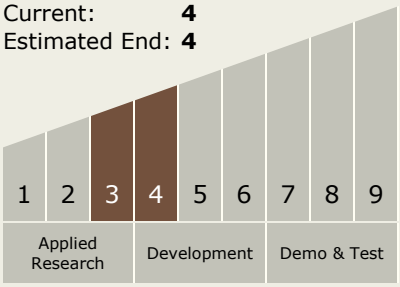
Carlos Torrez

Principal Investigator:

Venkat Mani

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Epoxy/UHMWPE Composite Hybridized with Gadolinium Nanoparticles for Space Exploration, Phase I

Completed Technology Project (2015 - 2015)

Images

Briefing Chart
Epoxy/UHMWPE Composite Hybridized with Gadolinium Nanoparticles for Space Exploration Briefing Chart
(https://techport.nasa.gov/image/129544)

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.5 Radiation
    - TX06.5.3 Protection Systems

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System